

Remarks

Claims 1-21 are pending in this application. Claim 12 has been amended in various particulars as indicated hereinabove.

The remainder of these remarks is set forth under appropriate subheading for the convenience of the Examiner.

Rejection Under 35 U.S.C. §102(b)

Claims 1-6, 8-18, 20, and 21 were rejected under 35 U.S.C. §102(b) as being anticipated by Schulze (US Patent No. 4,561,947).

This rejection is respectfully traversed for the following reasons.

It is well established that a claim is anticipated under 35 U.S.C. §102, only if each and every element of the claim is found in a single prior art reference.¹ Moreover, to anticipate a claim under 35 U.S.C. §102, a single source must contain each and every element of the claim “arranged as in the claim.”^{2, 3} Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference.⁴ If each and every element of a claim is not found in a single reference, there can be no anticipation.

As previously discussed, Applicants’ invention relates to a method for the recovery of a non-ferrous, rare or precious metal from an ore. In the method, the ore is treated in solution with an oxygen-containing oxidizing agent in the presence of a reducing agent having donor acceptor properties. The oxygen-containing oxidant reacts with the reducing agent to form reaction products (e.g., additional oxidizing agents,

¹ Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

² Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984).

³ Lewmar Marine Inc. v. Barient, Inc., 827 F.2d 744, 747, 3 U.S.P.Q. 2d 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988).

⁴ Titanium Metals Corp. v. Banner, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

radicals and/or reducing agent oxidation products) and the reaction products participate in the recovery. For example, the reaction products oxidize or form complexes with the non-ferrous, rare or precious metal, thereby transferring the metal to the solution.

The overall process and the role of oxygen-containing oxidants and reducing agents having donor-acceptor properties are illustrated throughout the application, for instance, in the reactions set forth on pages 5 and 6 of the specification or in the working examples.

The method set forth in Claim 1 specifies that the ore is treated with an oxygen-containing oxidant in the presence of a solvent and a reducing agent that has donor-acceptor properties, whereby the oxygen-containing oxidant and the reducing agent react to generate reaction products that oxidize or form complexes with said metal, thereby extracting said metal from the ore. As presently amended, the recovery method of Claim 12 includes combining an oxygen-containing oxidant and a donor acceptor reducing agent to form additional oxidizing agents and that the oxygen-containing oxidant and the additional oxidizing agents react with the non-ferrous, rare or precious metal to transfer the metal to the solution. Applicants' Claim 13 is directed to a liquid phase recovery method and specifies that the ore is treated with an oxygen-containing oxidant and with oxidizing agents formed by reactions between the oxygen-containing oxidant and a donor-acceptor reducing agent, to form metal compounds that dissolve in the liquid phase, thereby extracting the nonferrous, rare or precious metal from the ore. Finally, the method set forth in independent Claim 14 recites the steps of combining the ore with an oxygen-containing oxidant in the presence of a solvent; reacting at least a portion of the oxygen-containing oxidant with a donor-acceptor reducing agent to forms radicals and reducing agent oxidation products; and reacting said radicals and reducing agent oxidation products with nonferrous, rare or precious metals in the ore, to form soluble metal compounds, thereby recovering the nonferrous, rare or precious metals from the ore.

As previously discussed, Schulze teaches a process in which recovery of noble metals from ores is carried out by treating the ore with thiourea. Leaching with thiourea is a well known hydrometallurgical process (see, e.g., the discussion at Col. 1, lines 19-60 of Schulze, or the article entitled *Hydrometallurgy of Gold: New Perspectives and Treatment of Refractory Sulphide Ores* by M. C. Costa, *Fizykochemiczne Problemy Mineralurgii*, 31, pp. 63-72 (1997), enclosed for the convenience of the Examiner) and is distinct from the process claimed by Applicants.

As seen throughout the cited reference, thiourea is not “preferred”, as stated in the Office Action; rather it is an essential part of the process and the ore is always treated with thiourea. This is captured in the title (Process for the Recovery of Noble Metals From Ores; Which Process Uses Thiourea) and summarized, for instance, at Col. 1, line 65 through Col. 2, line 7 of Schulze:

Surprisingly, we have now found that, with the help of thiourea, it is possible, when maintaining certain reaction conditions, to recover noble metals from their ores in relatively short leaching times and in high yield.

Thus, according to the present invention, there is provided a process for the hydrometallurgical recovery of noble metals from materials containing them by treatment with thiourea in an aqueous, acidic medium in the presence of an oxidation agent, wherein the aqueous medium simultaneously contains an oxidation agent and a reduction agent.

See also Col. 2, lines 58-64 of Schulze:

This combination of thiourea, ferric salt and sulphur dioxide makes it possible, in the case of a considerably shorter leaching time, to obtain a substantially higher yield of noble metal and, in addition, also to make available to the noble metal recovery raw materials which cannot be digested with cyanides.

As previously discussed by Applicants, the problem addressed in Schulze is that of rapid thiourea consumption due to its oxidation by ferric salts, often present in the ore, or atmospheric oxygen. Reducing agents such as sulfur dioxide are added to control this rapid consumption of thiourea.

Further to arguments previously presented, Applicants note that the cited reference does not teach (nor fairly suggests) reacting the oxidants discussed in the Office Action, some of which are oxygen-containing, with the reducing agents disclosed at Col. 2, lines 1-7 and 44-50 of the reference, to form reaction products, additional oxidizing agents, radicals or reducing agent oxidation products. Nor does the reference teach (or fairly suggests) that these reaction products, additional oxidizing agents, radicals or reducing agent oxidation products react with the nonferrous, rare or precious metal to extract or recover the metal.

Since Schulze does not teach all the elements set out in Claims 1-6, 8-18, 20, and 21, it does not anticipate these claims. Accordingly, Claims 1-6, 8-18, 20, and 21 meet the requirements of 35 U.S.C. §102(b) in view of Schulze.

Rejection Under 35 U.S.C. §103(a)

Claims 7 and 19 are rejected under 35 U.S.C. §103(a) over Schulze.

This rejection is respectfully traversed for the following reasons.

Claims 7 and 19 depend directly or indirectly from Claims 1 and 14, respectively. Applicant respectfully submits that the above-presented arguments also support patentability of Claims 7 and 19 in view of Schulze. Accordingly, allowance of Claims 7 and 19 is respectfully requested.

It is believed that the present application is in condition for allowance. A Notice of Allowance is respectfully solicited in this case. Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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